[Time: 2 Hours] [Marks:40]

Please check whether you have got the right question paper.

N.B:
1. **Q. No.1 is compulsory.**
2. Draw neat labeled diagrams wherever necessary
3. Figures to right indicate full marks
4. Answer all sub question together
5. Use of calculator is allowed.

Q.1 a) Explain the following terms(ANY TWO) 04
    i)   Isocratic elution
    ii)   Guard column
    iii)   Student "t" test
    iv)   Internal standard

b) Name the following (ANY FOUR) 04
    i)   Two stationary phases used in reverse phase HPLC
    ii)   Two spray regents used in TLC
    iii)   Two ion pairing agents
    iv)   Two types of columns used in gas chromatography

Q.2 a) Write the principle involved in ion exchange chromatography. Give one application of ion exchange chromatography 04

b) Enlist the parameters for validation of analytical method. Explain any two in detail 04

Q.3 a) With the help of suitable diagram explain the working of refractive index detector. 04

b) Discuss any four factors affecting the thermo gravimetric curve 04

Q.4 a) Discuss techniques used in the sampling of liquids. 04

b) A chromatogram of a mixture A and B provided the following data on 25 cm column 04

	Retention time (min)	Peak Width at the base (min)
Non retained	2.0	--
A	14.2	1.2
B	17.9	1.5

Calculate   1) Resolution between A and B
                            2) Number of theoretical plates for B

Q.5 A) Enlist various pumps used in HPLC. Discuss any one in detail. 04

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b) Write a note on photo densitometry detection technique in HPTLC   04

Q.6 a)   Discuss various developmental techniques used in paper chromatography   04

b)   Calculate the correlation coefficient for the following data   04

Concentration (mg/ml)	Relative fluorescence intensity
2	22.0
4	40.9
6	59.7
8	81.2
10	100

Q.7   Write short notes on (ANY TWO)   08
  i)   Thermal conductivity detector
  ii)   Differential Scanning Calorimetry
  iii) Size exclusion chromatography
  iv) Head space analysis in Gas chromatography

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